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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,105	12/02/2003	Ta-Lee Yu	TS01-427B	4775
7590	11/04/2005		EXAMINER MANDALA, VICTOR A	
George O. Saile 28 Davis Avenue Poughkeepsie, NY 12603			ART UNIT 2826	PAPER NUMBER

DATE MAILED: 11/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/726,105

Applicant(s)

YU, TA-LEE

Examiner

Victor A. Mandala Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 8-14 and 27-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-13 and 27-34 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/19/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of embodiment 2 in the reply filed on 8/24/05 is acknowledged.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 27 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 27 teaches a first doped region and a second doped region, where the examiner is interpreting that the first doped region is the substrate of Figure 4 and the second doped region is the N-well in the substrate. The limitation in claim 27 that lacks enablement is in line 12 of claim 27, where the sixth doped region is within the fourth doped region. The examiner is interpreting the fourth region to be #118 of Figure 4 and the sixth region to be #120 of Figure 4. It is unclear how this can be true.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all of the limitations of the claim which it refers.

3. Claims 28-34 are rejected under 35 U.S.C. 112, fourth paragraph, for not being dependent from a claim previously set forth. Claim 20 is not a listed claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of U.S. Patent No. 6,268,639 Li et al.

4. Referring to claim 8, a semiconductor device electrostatic discharge protection structure on a substrate, (Admitted Prior Art Figure 2 #8), comprising: a first doped region, (Admitted Prior Art Figure 2 #10), of opposite dopant than said substrate, (Admitted Prior Art Figure 2 #8), extending down from the surface of said substrate, (Admitted Prior Art Figure 2 #8); a first isolation element, (Admitted Prior Art Figure 2 #12A), at the surface region first lateral boundary between said first doped region, (Admitted Prior Art Figure 2 #10), and said substrate, (Admitted Prior Art Figure 2 #8); a heavily doped second region, (Admitted Prior Art Figure 2 #16), with associated electrical contact area within said first doped region, (Admitted Prior Art Figure 2 #10), of similar dopant to said first doped region, (Admitted Prior Art Figure 2 #10); a heavily doped third region, (Admitted Prior Art Figure 2 #18), with associated electrical contact area within said first doped region, (Admitted Prior Art Figure 2 #10), of opposite dopant to said first doped region, (Admitted Prior Art Figure 2 #10); a heavily doped fourth region, (Admitted Prior Art Figure 2 #20), with associated electrical contact area within

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said substrate, (Admitted Prior Art Figure 2 #8), of opposite doping than said substrate, (Admitted Prior Art Figure 2 #8); a heavily doped fifth region, (Admitted Prior Art Figure 2 #22), with associated electrical contact area within said substrate, (Admitted Prior Art Figure 2 #8), of similar dopant to said substrate, (Admitted Prior Art Figure 2 #8); a heavily doped sixth region, (Admitted Prior Art Figure 2 #28), of same dopant as said doped second region, (Admitted Prior Art Figure 2 #16), located at the surface region second lateral boundary of said first doped region, (Admitted Prior Art Figure 2 #10), and said substrate, (Admitted Prior Art Figure 2 #8); a second isolation element, (Admitted Prior Art Figure 2 #12E), adjacent to said fifth doped region, (Admitted Prior Art Figure 2 #22), and on opposite side from said fourth doped region, (Admitted Prior Art Figure 2 #20); a first gate element, (Admitted Prior Art Figure 2 #26), overlying said surface region between said fourth doped region, (Admitted Prior Art Figure 2 #20), and said sixth doped region, (Admitted Prior Art Figure 2 #28); a first insulation element layer, (See \*\* below), on said substrate surface, (Admitted Prior Art Figure 2 #8), except on electrical contact areas; a first electrical conduction element, (Admitted Prior Art Figure 2 #24A), connecting said second, (Admitted Prior Art Figure 2 #16), and third doped regions, (Admitted Prior Art Figure 2 #18), to a first voltage source, (Admitted Prior Art Figure 2 #4); a second electrical conduction element, (Admitted Prior Art Figure 2 #24B), connecting said fourth, (Admitted Prior Art Figure 2 #20), and fifth doped regions, (Admitted Prior Art Figure 2 #22), and said first gate element, (Admitted Prior Art Figure 2 #26), and to a second voltage source, (Admitted Prior Art Figure 2 ground); and a top passivation layer, (See \*\* on the next page), overlaying said device surface.

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\* However, referencing Figure 1C, Li et al. clearly shows that it is well known in the art to use a silicon dioxide insulation layer (140) as a silicide blocking mask to protect device areas within the active region of a scr device (100) during fabrication of silicide layers on contact areas (i.e. regions 132, 126, 130, 124, 128, 122) and later removing unwanted refractory metal before performing a stabilization anneal to finalize the silicide contacts. (Column 2, line 40 - Column 3, line 13.)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made as disclosed in Applicant's own admitted Prior Art Figure 2 to further provide forming a silicon dioxide insulation layer on all non-contact active device regions in the scr device to serve as a blocking mask to protect the non-contact active device areas from being silicided as disclosed by Li et al. Lastly, the remaining process steps of forming the contacts, the passivation layer as well as the doping regions for the scr device is very well known in the art.

5. Referring to claim 9, a protection structure, wherein said substrate consists of P doped semiconductor material, (Admitted Prior Art Figure 2 #8).

6. Referring to claim 13, a protection structure, wherein said sixth heavily doped region, (Admitted Prior Art Figure 2 #28), forms an FET with said heavily doped fourth region, (Admitted Prior Art Figure 2 #20), and said first gate element, (Admitted Prior Art Figure 2 #26).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of U.S. Patent No. 6,268,639 Li et al. in further view of U.S. Patent No. 6,605,493 Yu.

7. Referring to claim 10, a protection structure, wherein said first doped region N doped, (Admitted Prior Art Figure 2 #10), with a concentration between  $1\text{E}16$  and  $1\text{E}18$   $\text{a}/\text{cm}^3$ , (See \*\*\* below), and forms a N-well, (Admitted Prior Art Figure 2 #10), within said substrate, (Admitted Prior Art Figure 2 #8).

\*\*\* Applicant's admitted prior art is silent on the specific concentration of dopant in the N-well of the ESD device, but Yu does in Col. 4 Lines 32-33). It would have been obvious to one having skill in the art at the time the invention was made to make the dopant concentration of the N-well to be between  $1\text{E}16$  and  $1\text{E}18$   $\text{a}/\text{cm}^3$  because the concentration makes the N-well highly conductive allowing for quicker carrier mobility and enabling the device to protect from electrostatic discharge more efficiently.

Applicant's admitted prior art discloses the claimed invention except for the dopant concentration of the N-well to be between  $1\text{E}16$  and  $1\text{E}18$   $\text{a}/\text{cm}^3$ . It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the dopant concentration of the N-well to be between  $1\text{E}16$  and  $1\text{E}18$   $\text{a}/\text{cm}^3$ , since it has been held to be within the general skill of a worker in the art to select a known

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material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

8. Referring to claim 11, a protection structure, wherein said second, (Admitted Prior Art Figure 2 #16), said fourth, (Admitted Prior Art Figure 2 #20), and said sixth heavily doped regions, (Admitted Prior Art Figure 2 #28), are N doped to a concentration between  $1\text{E}19$  and  $1\text{E}21 \text{ a/cm}^3$ , (See \*/\* below).

\*/\* Applicant's admitted prior art is silent on the specific concentration of dopant in the N doped regions of the ESD device, but Yu does in Col. 4 Lines 38-40). It would have been obvious to one having skill in the art at the time the invention was made to make the dopant concentration of the N heavily doped regions to a concentration between  $1\text{E}19$  and  $1\text{E}21 \text{ a/cm}^3$  because the concentration makes the N heavily doped regions highly conductive allowing for quicker carrier mobility and enabling the device to protect from electrostatic discharge more efficiently.

Applicant's admitted prior art discloses the claimed invention except for the dopant concentration of the N heavily doped regions to a concentration between  $1\text{E}19$  and  $1\text{E}21 \text{ a/cm}^3$ . It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the dopant concentration of the N heavily doped regions to a concentration between  $1\text{E}19$  and  $1\text{E}21 \text{ a/cm}^3$ , since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125 USPQ 416.



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9. Referring to claim 12, a protection structure, wherein said third, (Admitted Prior Art Figure 2 #18), and said fifth heavily doped regions, (Admitted Prior Art Figure 2 #22), are P doped to a concentration between  $1\text{E}19$  and  $1\text{E}21$   $\text{a}/\text{cm}^3$ , (See \*/\* below).

\*/\* Applicant's admitted prior art is silent on the specific concentration of dopant in the P heavily doped regions of the ESD device, but Yu does in Col. 4 Lines 32-33). It would have been obvious to one having skill in the art at the time the invention was made to make the dopant concentration of the P heavily doped regions to a concentration between  $1\text{E}19$  and  $1\text{E}21$   $\text{a}/\text{cm}^3$  because the concentration makes the P heavily doped regions highly conductive allowing for quicker carrier mobility and enabling the device to protect from electrostatic discharge more efficiently.

Applicant's admitted prior art discloses the claimed invention except for the dopant concentration of the P heavily doped regions to a concentration between  $1\text{E}19$  and  $1\text{E}21$   $\text{a}/\text{cm}^3$ . It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the dopant concentration of the P heavily doped regions to a concentration between  $1\text{E}19$  and  $1\text{E}21$   $\text{a}/\text{cm}^3$ , since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

***Allowable Subject Matter***

10. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor A. Mandala Jr. whose telephone number is (571) 272-1918. The examiner can normally be reached on Monday through Thursday from 8am till 6pm..

NATHAN J. FLYNN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

VAMJ  
10/28/05